

## REMARKS

Claims 1 - 13 are pending; no claims have been amended by this response.

Applicants have re-reviewed the amendment to the paragraph starting on line 21 on page 28 and made a further amendment by inserting the word use.

### 35 U.S.C. § 101 issues

In paragraph 6b of the Office action, independent claim 1 was rejected under 35 U.S.C. § 101 as directed towards a mathematical algorithm that did not recite a tangible result or have a tangible post-solution activity. Similarly, in paragraph 7b, claims 2 and 8 were likewise rejected under 35 U.S.C. § 101 because those claims were directed to mathematical operations. In support of the rejection of claims 2 and 8, MPEP § 2106 was cited with its apparent reliance on *In re Schrader*, 22 F.3d 290 (Fed. Cir. 1994). In *Schrader*, the claimed invention involved a method of competitive auction bids that were recorded, indexed, and assembled in such a way to maximize the bid price to the seller. The court indicated that the method was not patentable, in part, because there was no “data transformation.”<sup>1</sup>

Applicants traverse the rejection and request withdrawal thereof as not founded in the applicable law.

In the following two sections (“A” and “B”) applicant presents the applicable law in support of the claims as being within the bounds of 35 U.S.C. §101.

#### A.

The 1994 *Schrader* decision was handed-down prior to the decisions in the en banc *In re Alappat*, 33 F.3d 1526, 31 USPQ2d 1545 (Fed. Cir. 1994) decision, *State Street Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 47 USPQ2d 1596 (Fed. Cir. 1998), and *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352 (Fed. Cir. 1999).

*Alappat* circumscribed the Supreme Court’s stance on mathematical algorithms by indicating that certain types of mathematical subject matter, standing alone, that represent nothing more than abstract ideas are not entitled to patent protection until reduced to some type of practical application.<sup>2</sup> The *Alappat* inquiry simply requires an examination of the contested claims to see (a) if the claimed subject matter as a whole is a disembodied

1. *In re Schrader*, 22 F.3d 290, 294, 30 USPQ2d 1455, 1458 (Fed. Cir. 1994) (“Therefore, we do not find in the claim any kind of data transformation.”)

2. *In re Alappat*, 33 F.3d 1526, 1542, 31 USPQ2d 1545, 1556 (Fed. Cir. 1994) (in banc) (“the Supreme Court never intended to create an overly broad, fourth category of subject matter [mathematical algorithms] excluded from § 101”)

mathematical concept representing nothing more than a “law of nature” or an “abstract idea,” or (b) if the mathematical concept has been reduced to some practical application rendering it “useful.”

In *State Street*, data representing discrete dollar amounts were processed through a series of mathematical calculations to determine a final share price with the Federal Circuit introducing the “useful, concrete, and tangible result” test. The final share price calculated in *State Street* met the “reduced to some practical application rendering it useful” test of *Alappat*. With regard to the notion of a specific post-solution activity, it is noted that once the final share price was calculated in *State Street*, there was no apparent post-solution activity disclosed.

In *AT&T*, a numeric indicator, the PIC (primary interexchange carrier), was generated using Boolean operations and stored as a field in a message record for use in rendering bills to telephone subscribers; the PIC indicator was deemed to represent “... information about the call recipient’s PIC, a useful, non-abstract result that facilitates differential billing of long-distance calls. ... to produce a useful, concrete, tangible result without preempting other uses of the mathematical principle”.<sup>3</sup>

The examiner is asked to note that the *Schrader* decision referenced in MPEP § 2106 was subsequently characterized in the *AT&T* decision as “unhelpful” when testing to determine if 35 U.S.C. § 101 subject matter was present or not in a method claim.<sup>4</sup> While *Schrader* discussed “data transformation,” the *AT&T* decision noted that the Federal Circuit had clarified the notion of “transformation” in the pre-*Schrader* *Arrhythmia Research Tech. v. Corazonix Corp.*, 958 F.2d 1053, 22 USPQ2d 1033 (Fed. Cir. 1992) decision in which the algorithm included within the claimed process was applied to produce a number<sup>5</sup> which had specific meaning - a useful, concrete, tangible result - not a mathematical abstraction. It is again noted that there was no apparent post-solution activity disclosed in *Arrhythmia*.

In the applicant’s claims, successive data sets are taken to provide difference information that is further operated upon to provide a useful, concrete, tangible result that (a) does not preempt any mathematical algorithm in the abstract and (b) provides the useful, concrete, tangible result required by *State Street* (and *Arrhythmia*).

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3. *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352 (Fed. Cir. 1999)

4. *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352, 1258 (Fed. Cir. 1999) (“The focus of the court in *Schrader* was not on whether the mathematical algorithm was applied in a practical manner since it ended its inquiry before looking to see if a useful, concrete, tangible result ensued. Thus, in light of our recent understanding of the issue, the *Schrader* court’s analysis is as unhelpful as that of *In re Grams*.”)

5. *Arrhythmia Research Technology, Inc. v. Corazonix Corp.*, 958 F.2d 1053, 1060, 22 USPQ2d 1033, 1039 (Fed. Cir. 1992) (“That the product is numerical is not a criterion of whether the claim is directed to statutory subject matter.”)

B.

In the preceding section, applicant believes that the §101 statutory sufficiency of the rejected claims has been demonstrated by the discussion of the post-Schrader decisions. As explained in the following paragraphs, applicants submit that the claims rejected under 35 U.S.C. §101 are patentable in view of the earlier *In re Taner*, 681 F.2d 787, 790, 214 USPQ 678, 681 (CCPA 1982) decision. *Taner* involved seismic exploration and combined signals to simulate plane or cylindrical wavefronts to make possible a reduction in data correction efforts and thereby reduce the expenditures of time and money required for seismic exploration; claim 1 from Tanner's resulting patent is imaged to the right and shows the disputed "summing" step as the last sub-paragraph limitation.

In *Tanner*, the CCPA indicated, "Appellants' claims are not in our view merely directed to the solution of a mathematical algorithm. Though the claims directly recite an algorithm, summing, we cannot agree that appellants seek to patent that algorithm in the abstract." As is the case with the subsequent *State Street* and *Arrhythmia* decisions, there is no post-solution activity apparent in the *Tanner* claim.

The *Tanner* analogy with the presently disputed claims are clear; applicant is (a) not seeking to patent any algorithm in the abstract and (b) claims a method that provides a "useful, concrete, tangible result."

1. A method of seismic exploration by simulating from substantially spherical seismic waves the reflection response of the earth to seismic energy having a substantially continuous wavefront over an extent of an area being explored having at least one dimension which is large relative to a seismic wavelength, comprising the steps of:
  - (a) imparting the spherical seismic energy waves into the earth from a seismic source at a source position;
  - (b) generating a plurality of reflection signals in response to the seismic energy waves at a set of receiver positions spaced in an array over an extent having at least one dimension which is large relative to a seismic wavelength; and
  - (c) summing the reflection signals to form for the source position a signal simulating the reflection response of the earth to seismic energy having a substantially continuous wavefront over at least one dimension which is large relative to a seismic energy wavelength.

## 35 U.S.C. § 112 issues

In paragraph 9 of the Office action, claims 5 and 11 were rejected under 35 U.S.C. § 112 ¶1 as non-enabling with the examiner indicating that the limitations (i.e., parallelipiped of stacked prisms) are, verbatim, undisclosed within the specification. This rejection is respectfully traversed. The limitations of claims 5 and 11 are disclosed on page 15 of the specification between lines 24 and 26; a parallelipiped configuration is shown in FIG. 6 in which vertically stacked prisms or cells are shown in a rectangular grid pattern.

## 35 U.S.C. § 102 issues

In paragraph 11 of the Office action, claims 1-5 and 7-12 were rejected under 35 U.S.C. §102(e) as being anticipated by Schweitzer (U.S. 6,212,952); this rejection

is respectfully traversed. A 35 U.S.C. §102(e) rejection requires that each limitation of the claim be disclosed in the cited reference. Schweitzer discloses (between column 4, lines 52 and column 5, line 14), the taking of first and second time-displaced data sets to determine the time-dependent changes in the interface between the driveout fluid and the displaced oil or gas (as is also shown in the first execution box in FIG. 10B). As shown in the second execution box in FIG. 10B and as discussed at Col. 16, lines 46 - 52, the data can be "best-fitted" to provide a "forward model" or subject to inversion techniques to obtain a best model of the reservoir. While Schweitzer discloses time displaced data sets, the particulars of independent claims 1 and 7 are not presented. For example, the reference to column 3, line 45-67 as disclosing a figure of merit and the perturbation thereof is just not disclosed or even suggested; this insufficiency in the disclosure is sufficient to obviate the 35 U.S.C. §102 anticipation rejection.

### **35 U.S.C. § 103 issues**

In paragraph 14 of the Office action, claims 6 and 13 were rejected under 35 U.S.C. §103 as obvious in view of Schweitzer and Freedman (U.S. 4,919,616); applicants note that the independent claims (1 and 7) were not subject to a 35 U.S.C. § 103 rejection. While Freedman does mention a penalty function, it does so in a disparaging manner, viz., "This is one of the deficiencies in the penalty function method ..." at Col. 10, lines 11-12. Applicants contend that the disclosure of Freedman is such that one skilled in the art would not see a teaching for combination with Schweitzer with the requisite reasonable expectation of success.

Claims 6 and 13 are dependent, respectively, from independent claims 1 and 7 and are patentable as claims 1 and 7.

In view of the above, it is respectfully submitted that the application is in condition for allowance; an early formal indication thereof is respectfully requested.

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Respectfully submitted,



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